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# Complexity Theory and Agile Policy-Making

*Graham Room*

## Introduction

Complexity thinking has provided new insights into economic problems. Nevertheless, in many respects, it has also reminded us of older approaches to economic analysis that have long been sidelined by economic orthodoxy but are now being rediscovered. This chapter first considers how complexity thinking calls into question some of the central tenets of orthodox economic analysis before going on to provide three examples of the “agile policy-making” that this new perspective provides. Lastly, it points out some of the profound institutional changes needed to produce an efficient economic policy in a world of limited predictability and control.

## From equilibrium to the self-organizing economy

The economic orthodoxy of the 20th century taught that free markets, if left to themselves, would tend to equilibrium. They would also deliver efficiency and wealth, which would be distributed to the different factors of production according to their respective contributions. This orthodoxy was intellectually appealing because it could be couched in the sort of mathematics that had elevated physics to its enviable status as “queen of the sciences.” It appealed to business and its advocates because it seemed to endorse the value of their contribution to society, and it provided them with a rationale for fending off government regulation.

The middle of the century saw other voices displacing this orthodoxy. Schumpeter (1942) pointed to the waves of “creative destruction” set in motion by capitalist entrepreneurs. Keynes, however, warned that these entrepreneurs would sit on their hands in hard and uncertain times instead of investing in new technologies and products. Programs of public expenditure were needed, he added, that would not only raise demand in the short term, but also signal government commitment to an economy that would grow, thereby providing entrepreneurs with the confidence themselves to invest (Keynes 1936).

The Keynesian Revolution thus endorsed an active role for government. So did the New Deal in the United States. So did the postwar programs of welfare reform across the Western world. So did the Marshall Plan, rebuilding the economies of Western Europe. Nevertheless, the 1970s proved the high-water mark for this view of government and economy. Intellectually, it was sidelined by the mathematical sophistication of a resurgent economic orthodoxy (Bliss 2010). Politically, the proponents of collective welfare and active government were in retreat before the advocates of corporate interests.

Equilibrium thinking in economics was supposed to raise economics to the level of physics as a rigorous science. Complexity thinking – coming out of the natural and informational sciences – questions whether equilibrium thinking will suffice, even for physics. It is in this sense that complexity thinking has posed a new and fundamental challenge to economic orthodoxy in recent decades. Alongside this, the financial and economic crisis of 2008 put public confidence in the market system dramatically in question. It is the conjunction of these intellectual and political challenges that now promises a fundamental shift in our economic view of the world.

The literature on complex systems is concerned with the dynamics of change and the forms of self-organization that emerge without any designer at work. The question is now: How far can these insights be applied – and with what, if any, modifications – to the functioning of economies?

Accounts of economies as complex systems have provided a plausible new basis for the political creed of economic liberalism. According

to writers influenced by Hayek, modern societies are overregulated by the state and must be “liberated” so that they can self-organize (Parker and Stacey 1994). As Desai and Ormerod (1998: 1431) summarize, for such writers, “[t]he complex interaction of individual agents implies [...] that government intervention is not needed to revive the economy in a depression. The natural rhythms of the system itself ensure that a recovery takes place.” Evolutionary models of the economy echo such claims. For example, Dopfer and Potts (2008) argue that government should limit itself to promoting the creativity of citizens and securing the good order of the market.

Against this, as we have seen, Keynes doubted whether, under conditions of uncertainty, a modern economy can – to use the language of complex systems – self-organize at full employment of national resources and economic capacity without the active intervention of the state. This Keynesian perspective has been given added salience by the turbulence unleashed by the recent economic crisis (Skidelsky 2009; Eatwell and Milgate 2011). In the financial markets at least, “light touch” regulation has proved inadequate. Soros (2008) captures well the dynamics of the international economy as a “far-from-equilibrium” system, where animal spirits generate self-destructive volatility through flocking behavior.

A similar perspective has been offered by Arthur and others at the Santa Fé Institute (Arthur, Durlauf and Lane 1997: 16, 37). They describe a race between financiers, on the one hand, who invent new products to escape regulation but generate volatility that undermines system stability, and policy-makers, on the other, who establish new regulatory instruments only to find that the ground shifts again and the race starts afresh. This “arms race” within the financial system has then spilled into the wider economy and society. As Polanyi (1944) warned long ago, if markets are left to “self-organize,” this seems to produce social consequences, such as social inequality and insecurity, that undermine social consent and threaten to trigger a backlash against the very market institutions on which prosperity depends.

This is therefore a view of the economy as a complex system quite different from that taken by Hayek and his disciples. The difference

reflects deeper disagreements over how we are to conceptualize human agency within dynamic systems. On the one side is the view that human agency is a source of creativity and novelty at the micro level that drives technological progress within capitalism – but, beyond this, market and society can be left to evolve and self-organize through blind processes analogous to natural selection. Against this is the view that, under conditions of uncertainty, different social groups will actively strive to shape the overall direction of this self-organization, and public policy cannot but impinge on this struggle.

In the rest of the chapter, we will devote our attention to arriving at an understanding of purposive economic policy-making in a complex and uncertain world.

## **From rational choice to agile actors**

If modern economic orthodoxy has market equilibrium as one of its principal tenets, another is the “rational actor.” Such actors confront a menu of options, carrying particular costs, benefits and consequences, whose overall utility they then calculate. However, in a complex and evolving social and economic system, individual actors face uncertainty about how the future will unfold as well as about what consequences will follow from any choices they make.

There have been various attempts to take account of this “bounded rationality.” Although there may be incomplete information about the future, rational expectations theory responds that the actor knows the range of possible futures and the probability of each. It is more problematic if no such probabilities can be pre-assigned; this is the difference between risk and uncertainty (Simon 1969: Chapter 2). Matters are even worse if even the range of such possible outcomes cannot be confidently delimited.

This is not all. In the real world, it is rational for social actors not only to calculate costs and benefits, but also to act, to reshape the menu and thereby to make the options more attractive. These efforts – depending on the resources and power at the actors’ disposal – are liable

to be contested by others. Nevertheless, it is hardly possible for social actors in complex environments to anticipate the nonlinear, dynamic and sometimes counterintuitive consequences of such interactions (Kauffman 2008: Chapter 14). This is compounded by their limited ability to read and anticipate the intentions of others (Jervis 1997), yet another form of “bounded rationality.”

It is in light of these limitations that we offer instead the notion of “agile action” (Room 2011: Chapter 8). The majority of our actions each day involve “ordinary” situations that we handle almost unthinkingly, using standard templates and rules of thumb. These we learn as members of society, adapting them to our own particular contexts. Here is some solid ground, a safe and predictable vantage point – although this is never wholly secure in the face of adversity or unexpected bounty. Handling the “ordinary” situations of everyday life using standard rules of thumb leaves us free to devote most of our attention to novel problems and to probe terrains as yet unexplored. We deploy mental models as to how the world is likely to unfold and how we may be able to steer and shape it. This is even more demanding when we are faced with fellow actors who are trying to steer it in quite different directions.

This is “agile” action.<sup>10</sup> It is when actors detect anomalous patterns (including, for example, those falling outside certain critical thresholds) that they are alerted to the need for a response which does not rely on the standard templates of the habitual. These are situations that may present opportunities or threats of major existential significance for the actors in question. Which matters are handled in which way is itself therefore fluid; and this will vary between actors depending on their interests, resources and positional leverage.

Social actors not only probe the foggy landscape in which they find themselves; they may also disrupt the stable ground on which others

10 This notion of “agile action” owes much to Crouch’s discussion of “institutional entrepreneurs” (Crouch 2005: see esp. 67–68). Also relevant is the substantial literature on experimentation under uncertainty, which is concerned with the “mental models” we construct as a guide to our choices of action. Notable contributors include Simon (1969), Holland (1995) and North (1990).

stand. This is why uncertainty itself tends to be socially distributed, with more-advantaged groups progressively displacing its burden onto those in a weaker position (Marris 1996: Chapter 7). Probing, rather than producing convergent agreement, may therefore expose fundamental clashes of interests instead. It follows that the mental models that agile actors employ are not simply “technical” assessments of how the world is likely to unfold; they also embody competing moral claims as to what the world should be like and which entitlements and obligations social actors should respect.

## **Agile policy-making**

If the modern economy is an evolving, self-organizing system, but one in which public policy is unavoidably involved, what does this imply for the role of government? How can agile policy-makers “read” these complex and dynamically changing terrains? What real-time information is at their disposal to monitor these changes? And how can they evaluate this and draw appropriate lessons? To explore these questions, we can analyze three cases of policy-making.

## **Evidence-based policy-making**

How can policy-makers make good decisions? At least in the Anglo-Saxon world, the most common answer nowadays is that, to be good, policy decisions should be “evidence-based.” According to this view, it is only such policies that are likely to be effective; and with evidence to back them up, they can expect to command public support.

The advocates of Evidence-Based Policy-Making (EBPM) have been concerned, first and foremost, with evidence of the outcome or “impact” of a particular intervention. The randomized controlled trial (RCT) has a long-established reputation in the field of clinical interventions and pharmaceuticals; but, in recent decades, this has also been held up as the gold standard for assessing effectiveness across a

wide range of public-policy interventions (Room 2013). However, it has been subjected to a range of criticisms, including by Pawson (2006), who questions the language of “impact” as far as social-policy interventions are concerned. He insists that such interventions and their impacts depend heavily upon the social actors with whom they “engage”: both the street-level bureaucrats who deliver the interventions and the members of the target population.

Pawson – like RCT – focuses on a single policy intervention viewed in isolation. Policy interventions, however, are launched into a crowded policy “ecosystem.” Previous interventions shape the fears and hopes with which the public views any new initiative. These forerunners are not the mere detritus of policy enthusiasms long forgotten; in many cases, their champions are still at work, shaping the landscape onto which the new policy is launched. More than this, the new intervention is liable to trigger dynamic synergies with some elements of the policy system, to generate forms of “co-evolution” producing changes in direction that cannot be understood as the simple “impact” of the new intervention. Alternatively, the new intervention may be unable to break into policy ecosystems that are resilient against such new “invaders.” The policy-maker needs to be able to anticipate such dynamic effects – and to judge which ones will accelerate and reinforce his or her policy ambition as well as which ones could throw it off course. This is critical for any assessment of “what works” (Room 2013).

Of course, this does not necessarily mean the abandonment of RCT. How far these procedures can still provide useful guidance is a matter of practical judgment in specific empirical situations. In many situations, the dynamic synergies just discussed may be of little significance. After all, some degree of uniformity and stability are preconditions of all policy-making. Indeed, turbulence is not ubiquitous – if it were, life would hardly be possible!

This was, of course, central to the notion of “agile action” introduced earlier. RCT assumes that evidence can be systematically gathered so as to establish the effectiveness of any intervention, and that, armed with these templates, the policy actor can then deal with any



standard situation that he or she encounters. However, we also recognized that, from this stable vantage point, it is often necessary for social actors to probe more complex terrains using mental models about how the world is likely to unfold and how they may be able to steer and shape it. In such a dynamic policy ecosystem, RCT may be quite inappropriate.

Moreover, this choice of our analytical approach to evidence for policy is not just a technical question. Rather, it also involves judgments about the significance of different dynamic synergies in relation to the objectives not only of policymakers, but also of other stakeholders across the affected communities. Impact must be judged with reference to the various interests involved, and the weight that is given to those various interests involves a political judgment. Therefore, if policy analysts are to develop an evidence base for policy and practice, they must take full account of the political economy and distribution of power within which struggles over the future of the social and political order are being waged. If they clothe this task in the language of technical measurement and reified system dynamics, this is itself a political choice.

## **Investment in citizens**

Drawing on behavioral psychology, Thaler and Sunstein (2009) argue that many ordinary citizens behave irrationally, that they are prone to inertia, bias and short-sightedness. For this reason, they must be “nudged” in the direction the government deems good for them.<sup>11</sup>

We approach individual decision-making from a different vantage point. In a complex social and economic “ecosystem,” ordinary citi-

11 Recent contributions to the debate include John, Smith and Stoker (2009), Oliver (2013) and Leggett (2014), each of whom provides a useful stocktaking of this burgeoning literature. For a useful overview of some of the literature and debates, see also Delaney (2013). The House of Lords Science and Technology Committee (2011) reviews the practical effectiveness of “nudges,” but also their limitations when not used in combination with a range of other interventions.

zens are afflicted not so much by irrationality as by uncertainty regarding how the future will unfold and what consequences will follow from any train of action they pursue. Like policy-makers, they need some solid ground, a sufficient expanse that is safe and predictable. From these anchorages, they can then venture forth as creative and agile actors, shaping the world they live in, albeit on a modest scale. If that ground is too shrunken – in other words, if there is too much turbulence and uncertainty – the actor in question will “hunker down” and wait for times to get better.

Clark and Heath (2014) have shown that inequality exacerbates anxiety across society. During the current austerity, in the United Kingdom at least, this has in turn produced a so-called “social recession,” with a decline in volunteering and “informal kindness.” They conclude (*ibid.*: 221; see also Orton 2015): “Until we have an economy that delivers fairer shares and some measure of security across society, such anxiety will never be banished, and [...] neither ‘general well-being’ nor community life is going to be safe.”

This shifts the focus from individual psychology to political economy. It suggests that instead of nudging citizens, government should invest in their security and creativity as well as in those of their social, economic and political communities. It also recognizes that citizens’ failure to take up the options that government deems right for them may attest not to their blunders and biases, but to their disenchantment with the behavior of the government itself, to their wish for “voice, not choice,” and to their inability to nudge government in a different direction. In short, it shifts the spotlight’s focus from the behavior of citizens to that of governments.

This also presupposes the active involvement of citizens in the governance of our social, political and economic institutions. It is not enough for government to provide stability and security and to invest in agile and creative citizens; the latter must also be able to hold government to account. This means that government must be placed under critical scrutiny by citizens, rather than vice versa. As a result, citizens are given a fundamental role in both making and implementing policy. A “nudge,” in contrast, gives them a role merely in the lat-

ter – and, even then, only as consumers reacting to the choices the government presents them. There is little or no attempt to engage citizens as active, critical and responsible partners; they are deemed hardly up to that.

The recent direction of social policies, in the United Kingdom and elsewhere, has been to push as many people as possible into the market place and to narrow the bounds of public generosity toward those who remain. The very governments that sing the merits of nudging have been passing much of the burden of austerity onto the most disadvantaged, thereby multiplying the uncertainties to which they are exposed. This is the politics of fear – and of surrender to the global market.

### **The European economy**

Economic orthodoxy has driven the policy response to the global recession – and nowhere more so than in Europe. This orthodoxy tells governments to return to the mantras of the 1920s: balanced budgets, low inflation, stable currencies and support for business. If the mass of the population has to suffer, they can rest assured that prosperity will eventually return and trickle down to them. However, a complexity-inspired analysis of the contemporary economic situation suggests a quite different approach.

First, it is not only individual citizens who need some security and solid ground; the same holds true for entrepreneurs, who otherwise will also “hunker down” and wait for times to get better. If businesses are to invest in technology and people, they must have confidence that there will be an economy sufficiently buoyant to bring them a reasonable return. As noted earlier, this was a central argument of Keynes. Indeed, it was a general assumption of Western governments during the postwar decades and lasting until the neo-liberal attack on active government took hold during the 1980s (Shonfield 1965).

Second, as we have seen, any policy intervention unfolds within a dynamic policy “ecosystem.” This is true, not least, of government at-

tempts to shore up the European economy. They reveal the counterintuitive consequences of orthodox economic policies, the conflicting interests of the various stakeholders involved and the sanitization of these conflicts in the technocratic language of debt repayment.

Twice in the last century, a harsh corset has been placed on the European economy in the belief that it would be the path to economic recovery. In 1919, the Treaty of Versailles imposed heavy reparations on Germany and restrictions on how it might rebuild its industrial base. Keynes famously condemned the Treaty in *The Economic Consequences of the Peace* (1919). This was in part on grounds of justice – and the need to build a peace in which the new and democratic Germany would feel included. It was also because a Germany without a thriving economy would hardly be in a position to pay the reparations that were being exacted. However, it was primarily in relation to the rebuilding of the European economy as a whole that Keynes advanced his case: Europe had highly interdependent national economies, Germany's was the central one, and restoring prosperity to Europe would be impossible if Germany remained devastated.

The Treaty established a Reparation Commission to enforce its financial requirements. For this purpose, it was given “wide powers over the internal economic life of the enemy countries, who are to be treated henceforward as bankrupt estates to be administered by and for the benefit of the creditors” (ibid: 118). As such it was likely to become “an instrument of oppression and rapine” (ibid.: 123). In contrast, amidst the gloom, Keynes applauded the American Relief Commission of 1919, which “not only saved an immense amount of human suffering, but averted a widespread breakdown of the European system” (ibid.: 157). It was on such generosity that he pinned his hopes for rebuilding European prosperity.

In 1919, much of Europe's infrastructure and industry lay in ruins. Ninety years later, its financial system lay in ruins, and its economy and employment under grave threat. Enormous injections of public funds were used to prop up the financial system and, in an effort to balance government finances, public spending was cut, notably on public services and welfare expenditures. As in 1919, new mecha-

nisms of financial administration at a European level were set in place. These were new rules of fiscal prudence to be enforced across the euro zone.

This is hardly conducive to proactive public investment programs of the sort that Keynes envisaged. Without these, however, the European Union is likely to face general deflation and zero or low growth for the rest of this decade. Fiscal reform and belt-tightening will still be required in many countries. But this will be much easier if economic growth can be restarted. Keynes tells us that if we take care of growth, the public deficit will take care of itself. Fiscal reform can, in any case, mean many things: It may mean cutting back on public services and support for the poor. But it can also mean cutting back on fiscal welfare for the rich and the closing of tax havens. Politics will be back.

## Conclusion

Complexity thinking has provided new insights into economic problems. It is concerned with the dynamics of change and the forms of self-organization that emerge in an economy. Yet while the order and regularities of social and economic life may attest in part to this self-organization as a complex system, they attest no less to the exercise of power and to the success of some social actors in negotiating or imposing that order on others. This brings interests, power and politics to center stage. Complexity analysis must be combined with political economy (Room 2011).

This must then also inform the analysis and development of public policy. Civility does not “self-organize”; it must be politically constructed. And we cannot escape the social and political choices of our time.

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